

Abstract

A system useful in performing active biological reactions includes an array of unit cells arranged in rows and columns. Row lines are coupled to row contacts of unit cells of the array. A row selector is coupled to the row lines to provide a row select voltage. Column lines are coupled to column contacts of the array. A column selector is coupled to the column lines to provide more than two column voltage states on the column lines. The unit cells are coupled to a supply and to an electrode, the row select and column select voltage states provides variable current output from the electrode of the unit cell. A return electrode is coupled to a potential and adapted to contact conductive solution including charged biological materials, wherein in the presence of the conductive solution, current is provided between various unit cells and the return electrode.